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of a New Subspecies from Nicaragua

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Records of Harvest Mice, *Reithrodontomys*, from Central America, with Description of a New Subspecies from Nicaragua

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Since 1952 when Hooper's review of Latin American harvest mice was published, collectors from the Museum of Natural History of the University of Kansas have visited several countries in Central America, and have obtained many additional specimens. Among these we find a new subspecies of *Reithrodontomys fulvescens* from Nicaragua, significant extensions of known geographic range for several other species, and additional information on variation in some little known kinds. Specimens in the Museum of Natural History of *Reithrodontomys mexicanus cherriei*, *Reithrodontomys tenuirostris*, and *Reithrodontomys creper* that are from within the geographic and altitudinal ranges listed by Hooper (1952) are not included in this report.

All place names are on the map of Hispanic America published by the American Geographical Society and can be located by consulting the "Index to map of Hispanic America" (Vol. 1, Geographical names in Central America, U. S. Government Printing Office, Washington, D. C., 1943.) All measurements cited are in millimeters.

Support for field work was provided by the Kansas University Endowment Association. Support for the laboratory phases of the work came in part from a grant from the National Science Foundation. Most of the specimens herein reported were collected by James W. Bee in late 1954 and early 1955, and by J. R. Alcorn and A. A. Alcorn in 1955 and 1956. A few that were collected earlier by other persons are mentioned. We are indebted to the following individuals for the loan of specimens in their care: R. G. Van Gelder, American Museum of Natural History; Philip Hershkovitz, Chicago Natural History Museum; W. H. Burt and E. T. Hooper, Museum of Zoology, University of Michigan; and D. H. Johnson and C. O. Handley, Jr., U. S. National Museum.

Reithrodontomys sumichrasti australis J. A. Allen.—Seven specimens from the vicinity of Volcan Irazú, Cartago, Costa Rica, are from within the geographic and altitudinal range recorded for the subspecies by Hooper (1952:82).

One female, KU 26967, trapped on March 2, 1947, on the SW slope of Volcan Irazú, 8500 ft., contained five embryos that were 17 mm. in crown-rump length.

Reithrodontomys sumichrasti dorsalis Merriam.—A total of 93 females are among 195 specimens from 24 localities in Guatemala that lie within the geographic and altitudinal range recorded by Hooper (1952:78) for *dorsalis*.

Two females were pregnant; KU 71363, taken on January 28, 1956, 7 mi. E, 2 mi. S La Unión, Quetzaltenango, Guatemala, contained three embryos that were 7 mm. in crown-rump length, and KU 65245, taken on December 15, 1954, 1 mi. NE Nebaj, 6000 ft., El Quiche, Guatemala, contained four embryos that were 15 mm. in crown-rump length. These two females were the only pregnant ones among 36 taken in December, 23 in January, 1 in February, 19 in March, 5 in April, and 9 in August.

Reithrodontomys fulvescens chiapensis Howell.—GUATEMALA.—Baja Verapaz: ½ mi. N, 1 mi. E Salamá, 3200 ft., 1 (KU 65378—January 28, 1955); 1 mi. S Rabinal, 3450 ft., 4 (KU 65379-82—January 29, 1955); 5 mi. N, 1 mi. W [Santa Cruz] El Chol, 6000 ft., 1 (KU 65375—January 30, 1955). Guatemala: 5 mi. S Guatemala City, 4950 ft., 2 (KU 65371-72—March 13, 1955); 7 mi. S, 6 mi. E Guatemala City, 5800 ft., 1 (KU 65370—March 14, 1955). Santa Rosa: 2 mi. N, 2 mi. W Cuilapa [= Cuajiniquilapa], 2980 ft., 2 (KU 65376-77—March 5, 1955).

The specimens from the departments of Guatemala and Santa Rosa are from localities that lie on the Pacific slope and are southwest of the previously known range of the species (see Hooper, 1952:93). The specimens from ½ mi. N and 1 mi. E Salamá and from 1 mi. S Rabinal are paler dorsally than other Guatemalan specimens available to us, including the specimen from the nearby locality, 5 mi. N and 1 mi. W El Chol.

Specimens from Nicaragua that are recognizable by the E-shaped pattern of the worn occlusal surface of the third upper molars and by the S-shaped occlusal pattern of the third lower molars as of the species *Reithrodontomys fulvescens*, extend the known range of the species approximately 200 kilometers southeast from the vicinity of Tegucigalpa, Honduras (Hooper, 1952:93). The Nicaraguan specimens are described below as a new subspecies.

Reithrodontomys fulvescens meridionalis, new subspecies

Type specimen.—Skin and skull of adult male, no. 71388 Museum of Natural History, University of Kansas, from 9 mi. NNW Estelí, Estelí, Nicaragua; obtained by J. R. Alcorn on July 15, 1956; original number 21,464.

Diagnostic characters.—A short-tailed *Reithrodontomys fulvescens* having a distinctly streaked or "peppered," and short pelage composed of relatively dark hairs as well as relatively brightly colored hairs on dorsum and white-

tipped hairs on venter; and having shallow skull, elongate and posteriorly attenuate incisive foramina, small postpalatal foramina, broad interorbital region, and mid-dorsal depression at junction of nasal and frontal bones.

Comparisons.—Each of three adults of *meridionalis* (trapped in February and March) can be distinguished from seven adults of the geographically adjacent *R. f. chiapensis* from Guatemala (trapped in late January and in March) by shorter tail, more streaked or “peppered” dorsal pelage, yellower hue of non-blackish parts of hairs on dorsum, less distinct mid-dorsal darkening, and more whitish (less buffy) venter.

Four specimens of *meridionalis* trapped in July at the type locality, only one mile from the locality of capture of the February-taken specimens, are distinctly darker dorsally and slightly darker ventrally than the three *meridionalis* trapped in February and March, but resemble the latter three in shortness of tail and in having short, “peppered” dorsal pelage. We lack specimens of *chiapensis* in summer pelage. According to Hooper (1952:122) the summer pelages of *R. f. chiapensis* and *R. f. helvolus* are indistinguishable. Our *meridionalis* differ from five summer-taken specimens of *helvolus* in shorter, more “peppered,” and distinctly darker dorsal pelage.

Six skulls of *meridionalis* were matched with six skulls of *chiapensis* having approximately the same amount of wear on the teeth, and the series were compared, pair by pair, in various cranial characters. In five of the six pairs *meridionalis* had a less inflated braincase, and smaller postpalatal foramina, and in each of the six pairs *meridionalis* had a greater depression in the frontonasal region and posteriorly more acute incisive foramina. Four external measurements and nine cranial measurements were compared using the series of *meridionalis*, the series of *chiapensis* from Guatemala, and Hooper's (1952:213) measurements of seven *chiapensis* from central Chiapas. The lesser average and maximum total length of skull in *meridionalis* than in either series of *chiapensis* suggests that *meridionalis* has a smaller skull. Externally, the lesser total length of *meridionalis* is largely owing to its shorter tail; there is little difference in length of head and body between *meridionalis* and *chiapensis*. The longest tail among our *meridionalis* is shorter than the shortest tail among the *chiapensis* (disregarding two Guatemalan specimens of *chiapensis* that probably had injured tails). The interorbital breadth of *meridionalis* is on the average greater and the depth of cranium is less than in *chiapensis*. There is some overlap in the range of each of these two cranial measurements, but in

all *meridionalis* the interorbital breadth exceeds 42 per cent of the depth of cranium, and in all *chiapensis* is less than 42 per cent. The length of the incisive foramina in *meridionalis*, expressed as a percentage of the total length of the skull, is usually greater than in *chiapensis*.

One of our specimens (KU 71389) contained four embryos that measured 5 mm. in crown-rump length.

Measurements.—Selected measurements of the holotype, followed by the average and extreme measurements of six specimens of *meridionalis* (including the holotype) from the vicinity of the type locality are: total length, 154, 152.0 (148-154); length of tail, 82, 82.0 (81-83); length of hind foot, 17, 18.0 (17-19); length of ear from notch, 13, 13.3 (12-14); total length of skull, 21.4, 21.13 (20.3-21.7); zygomatic breadth, 10.0, 10.38 (10.0-10.6); breadth of braincase, 10.1, 10.17 (9.9-10.4); depth of skull, 8.2, 8.00 (7.8-8.3); interorbital constriction, 3.7, 3.53 (3.4-3.7); breadth of rostrum, 3.8, 3.75 (3.6-3.9); length of rostrum, 7.4, 7.33 (7.1-7.7); length of incisive foramen, 4.6, 4.47 (4.2-4.6); length of upper molar tooth-row, 3.2, 3.32 (3.2-3.5). Corresponding measurements of a specimen from 11 mi. SE Darío are: 153, 82, 18, 13, 20.7, 10.3, 10.1, 7.8, 3.4, 3.6, 7.2, 4.3, and 3.2.

Specimens examined, 8, as follows: NICARAGUA.—Estelí: 9 mi. NNW Estelí, 4 (KU 71386-89—July 15, 1956); 8 mi. NNW Estelí, 3 (KU 71393-95—February 5, 1956). Matagalpa: 11 mi. SE Darío, 1 (KU 71392—March 21, 1956).

Specimens of *Reithrodontomys fulvescens helvolus* used in comparisons: OAXACA: 3 mi. ESE Oaxaca, 1 (KU 68891—June 24, 1955); 3 mi. W Mitla, 4 (KU 68892-95—August 5 to 9, 1955).

Reithrodontomys gracilis anthonyi Goodwin.—EL SALVADOR.—Santa Ana: 2 mi. SE San Cristóbal, 2950 ft., 2 (KU 65401-02—March 6, 1955). GUATEMALA.—Jutiapa: 2½ mi. W, 2¼ mi. N San Cristóbal [El Salvador], 2900 ft., 5 (KU 65396-400—March 6, 1955).

The subspecies *anthonyi* has been known previously by seven specimens, none of which is fully adult, judging from Hooper's (1952:134) comment that the adult pelage of *anthonyi* is unknown. Six of our seven specimens are clearly adults as is shown by well-worn teeth and degree of development of temporal ridges. The seventh is a young animal in process of postjuvinal molt. Individuals from our series in general resemble specimens of *Reithrodontomys mexicanus orinus* from the vicinity of Guatemala City but differ from the latter as follows: dorsal pelage brighter (with less suffusion of black), "peppered" in appearance, shorter and sparser; ears distinctly paler, owing both to the paler color of the skin and the paleness of the hairs inside the pinna; dark tarsal stripe not extending onto hind foot; ears and hind feet uniformly smaller; averaging smaller in cranial dimensions (but there is considerable overlap), braincase less convex dorsally.

Measurements of the adult *anthonyi* now available show that the subspecies reaches a greater size than was apparent in the sample

available to Hooper. Consequently the three largest adults would be identified as *R. mexicanus* according to Hooper's key (1952:31), rather than *R. gracilis*, and the three smallest adults could not be unequivocally identified as either one species or the other.

The ranges of *R. gracilis* and *R. mexicanus* are allopatric except in southern Guatemala where the ranges overlap. However, the two species have not been taken there at the same place.

In comparison with May-taken adults of *R. g. harrisi* from 3 mi. SW Managua, Nicaragua, the adult *anthonyi* average brighter (more orange) in color (but two of the *anthonyi* cannot be distinguished by color when placed with the *harrisi*), and are larger in total length, length of tail, and size of skull.

One female (KU 65400) contained two embryos that measured 18 mm. in crown-rump length.

Average and extreme external and cranial measurements of the six adults are: total length, 183.6 (170-198); length of tail, 106.0 (95-113); length of hind foot, 18.0 (18); length of ear from notch, 14.0 (14); total length of skull, 22.21 (21.4-22.8); zygomatic breadth, 11.20 (10.9-11.7); breadth of braincase, 10.90 (10.3-11.4); depth of skull, 8.36 (8.0-9.0); length of rostrum, 7.60 (7.3-7.8); breadth of rostrum, 4.24 (4.0-4.6); interorbital constriction, 3.78 (3.6-4.0); length of incisive foramen, 4.05 (3.8-4.3); length of upper molar tooth-row, 3.28 (3.1-3.4). Weight in grams of the adults averaged 14.3 (12-17).

Reithrodontomys gracilis gracilis Allen and Chapman.—GUATEMALA.—El Petén: Uaxactún, 1500 ft., 2 (KU 65384-85—April 3, 1955).

These specimens are the first of the subspecies to be recorded from Guatemala. Uaxactún is near, but not within, the range of *R. g. gracilis* as mapped by Hooper (1952:131). The male, KU 65384, and female, KU 65385, are adults with comparatively unworn molar teeth. Respective external measurements are: total length, 178, 175; length of tail, 106, 102; length of hind foot, 18.5, 19; length of ear from notch, 14, 14.

Reithrodontomys gracilis harrisi Goodwin.—NICARAGUA.—Estelí: 9 mi. NNW Estelí, 1 (KU 71342—July 15, 1956). Managua: 3 mi. SW Managua, 15 (KU 71345-59—February, May, June, 1956); 4 mi. W Managua, 2 (KU 71360-61—June 26, 28, 1956).

Comments on the series from 3 mi. SW Managua have appeared elsewhere (Englert, 1959:153). The specimen from 9 mi. NNW Estelí contained four embryos that measured 5 mm. in crown-rump length.

Reithrodontomys gracilis pacificus Goodwin.—EL SALVADOR.—San Salvador: 1 mi. NW San Salvador, 1 (KU 71396—July 29, 1956).

In coloration (being but slightly paler), and in small size, this specimen resembles the description of *R. g. pacificus* given by Hooper (1952:135) and ten specimens of *pacificus* (nine from Guatemala and one from Chiapas) examined by us. Because of this resemblance and the marked contrast with specimens of *R. g. anthonyi* discussed above we assign this specimen to *pacificus*. In comparison with two topotypes (AMNH 79062, 79090) of *R. g. anthonyi* from Sacapulas, Guatemala, taken on February 9 and March 2 that are essentially the same age as KU 71396, the latter specimen is darker dorsally, the tail is darker both dorsally and ventrally, and the skull is smaller. In paleness of upper surface of hind feet, length of palate relative to length of incisive foramina, and size of bullae, KU 71396 resembles *anthonyi*. We interpret these resemblances to *anthonyi* as evidence of intergradation between *pacificus* and *anthonyi*. Felten (1958:9) referred two specimens from El Salvador (one from San Salvador and one from Amate de Campo, Departamento de La Paz) to *anthonyi*, without comparison with *pacificus* and with no mention of examination of other specimens of *Reithrodontomys gracilis*. When the distribution and variation of *R. gracilis* in this region are more adequately known these two specimens may well be reassigned to *pacificus*. Hooper (1952:134) observed that two specimens from Monte Cristo Mine in eastern El Salvador were the smallest and darkest of the *R. g. anthonyi* examined by him and approached *R. g. pacificus* in these particulars. Possibly these specimens from Monte Cristo Mine also should be assigned to *pacificus* rather than *anthonyi*. External measurements of KU 71396 are: total length, 167; length of tail, 99; length of hind foot, 19; length of ear from notch, 13. The specimen contained four embryos that measured 10 mm. in crown-rump length.

Reithrodontomys microdon microdon Merriam.—GUATEMALA.—Huehuetenango: 2 mi. S San Juan Ixcay, 9340 ft., 10 (KU 65404-13—December 24 and 25, 1954); 3½ mi. SW San Juan Ixcay, 10,120 ft., 4 (KU 65210, 65414-15, 65417—December 27 and 28, 1954). San Marcos: 3¼ mi. N, ¼ mi. E San Marcos, 9500 ft., 1 (KU 65420—March 22, 1955). Totonicapán: 5 mi. ESE Totonicapán, 4 (KU 68897-900—July 17, 1955).

All the localities from which we have examined specimens fall within the geographic range of the subspecies as mapped by Hooper (1952:168). He examined six specimens of *R. m. microdon* and listed external and cranial measurements for only two specimens.

Average and extreme external measurements of 13 adults (7 males, 6 females) from the vicinity of San Juan Ixcay are: total length, 176.5 (168-187); length of tail, 105.8 (100-110); length of hind foot, 19.5 (19-20); length of ear from notch, 16.8 (15-18). The average weight in grams of these same specimens is 9.1 (8-11). Average and extreme cranial measurements of 12 specimens from the same series (7 males, 5 females) are: total length of skull, 22.55 (21.6-23.0); zygomatic breadth, 10.82 (10.2-11.2); breadth of braincase, 11.02 (10.6-11.4); depth of skull, 8.67 (8.4-8.9); interorbital constriction, 3.78 (3.6-3.9); breadth of rostrum, 3.86 (3.6-4.0); length of rostrum, 8.33 (8.1-8.6); length of incisive foramen, 4.27 (4.0-4.5); length of palate, 3.48 (3.2-3.8); length of upper molar tooth-row, 3.25 (3.0-3.4).

Reithrodontomys mexicanus howelli Goodwin.—GUATEMALA.—Baja Verapaz: 5 mi. N, 1 mi. W [Santa Cruz] El Chol, 6000 ft., 3 (KU 65315, 65386-87—January 30, 1955). El Quiche: 1 mi. NE Nebaj, 6000 ft., 2 (KU 65275, 65277—December 19, 1954). Huehuetenango: 5 mi. E, 1 mi. N Huehuetenango, 7000 ft., 2 (KU 65418-19—December 22, 1954). Santa Rosa: 1 mi. WSW El Molino [= approximately 1 mi. S, 6 mi. E Cuajiniquilapa], 1 (KU 71315—August 3, 1956).

The specimen from 1 mi. WSW El Molino is from within the range of the subspecies *R. m. orinus* as mapped by Hooper (1952: 141), coming from a locality to the southeast of the two westernmost localities shown by him for *orinus*. This mouse is distinctly darker than any of the specimens of *orinus* discussed beyond, and is as dark as the darkest *howelli* seen by us. In addition to the specimens of *howelli* listed above, we have examined 12 from Prusia, Chiapas (UMMZ 88351-58, 96810-13), and three from 3 mi. NW San Cristóbal, Chiapas (KU 66680-82).

R. m. howelli may occur at moderate elevations along the coast of southern Guatemala, or possibly this specimen represents a population of dark-colored mice that is isolated from similarly colored populations to the north and west. According to the field notes of Albert A. Alcorn, the collector, this specimen was taken in a "tree set." Perhaps pale-colored and dark-colored populations of *R. mexicanus* are sympatric but ecologically segregated in this region.

Reithrodontomys mexicanus lucifrons Howell.—NICARAGUA.—Jinotega: 1 mi. NW Jinotega, 1 (KU 71344—April 12, 1956); 5 mi. S, 2 mi. E Jinotega, 1 (KU 71343—April 12, 1956).

Comments on these specimens have appeared earlier (Englert, 1959:153).

Reithrodontomys mexicanus orinus Hooper.—GUATEMALA.—Guatemala: 5 mi. S Guatemala City, 4950 ft., 2 (KU 65388-89—March 11, 1955); 6 mi. S Guatemala City, 4680 ft., 3 (KU 65390-92—

March 10, 1955); 7 mi. S, 6 mi. E Guatemala City, 5800 ft., 2 (KU 65393-94—March 14, 1955).

Our seven specimens are from near the northwestern edge of the geographic range of *orinus* (where it meets that of *howelli*) as mapped by Hooper (1952:141). Nevertheless, they are distinctly brighter dorsally, paler ventrally, and average larger than the specimens listed in the account of *R. m. howelli* above. Also, they match well in size and coloration the specimens from nearby Lago de Amatitlan (USNM 275406-09) and Finca San Rafael (CNHM 41770) that were referred by Hooper to *R. m. orinus*. He (*op. cit.*: 149) noted that these last-mentioned specimens were slightly darker than topotypes of *orinus* and differed from them in several minor cranial features, which he interpreted as evidence of intergradation with *howelli*.

Reithrodontomys brevirostris Goodwin.—COSTA RICA.—Alajuela: 5 mi. SW San Ramón, 1 (KU 71362—July 11, 1956). NICARAGUA.—Carazo: 3 mi. NNW Diriamba, 2 (KU 71390-91—June 16, 21, 1956).

External measurements of these three specimens are respectively: total length, 179, 167, 173; length of tail, 107, 96, 101; length of hind foot, 19, 18, 18; length of ear from notch, 15, 13, 13. The teeth show about the same moderate wear in each of the three specimens. Our *brevirostris* differ noticeably from specimens of *Reithrodontomys mexicanus cherriei* and *R. m. lucifrons* that we have seen in duller, darker, and less reddish color. One specimen, KU 71390, still has a patch of gray juvenal pelage on the nape; the newer pelage elsewhere is shorter and sparser than that of the other two specimens. In addition, No. 71390, a female, contained no embryos, but has two pairs of mammae, one pair pectoral and one inguinal, that are conspicuous on the dried skin; perhaps this female was lactating when captured. The mammae of KU 71362, also a non-pregnant female, are inconspicuous on the dried skin. The Nicaraguan specimens extend the known geographic range approximately 270 kilometers northwestward from near Villa Quesada, Alajuela, Costa Rica, and are the first records of the species from Nicaragua.

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